

A New Subspecies of *Papilio indra* from Central Nevada¹

(Lepidoptera: Papilionidae)

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The state of Nevada has remained nearly virgin collecting territory for the lepidopterist until the last decade. Since then, a rising tide of interest has been shown in this region of isolated mountain ranges, deserts, and high valleys.

During the summer of 1967, one of us (J.F.E.) spent nearly two weeks collecting insects in Nevada in the company of Oakley Shields of Davis, California, and Scott Ellis of Hotchkiss, Colorado. In the course of this expedition numerous new distribution records of Great Basin species were gathered as well as specimens of an atypical representative of *Papilio indra* Reakirt. Subsequent expeditions in 1968 and 1969 by J. Emmel and Shields produced additional adult material of this *Papilio* as well as immatures.

The present paper describes the new subspecies of *Papilio indra*; future papers will describe the biology of this butterfly and evolutionary relationships of this and other populations within the *P. indra* complex.

***Papilio indra nevadensis* Emmel & Emmel, new subspecies**

(Fig. 1)

MALE.—*Forewing radius*: 35.7–45.0 mm. *Tail length*: 4.8–6.6 mm. *Primaries, superior surface*: Wing more elongate than typical *P. indra*; ground color jet black; pale yellow submarginal spots less prominent, while postmedian row of pale yellow arrow-shaped markings more prominent than in typical *P. indra*; yellow bar at distal end of cell absent or obsolescent, whereas usually present in typical *P. indra*. *Secondaries, superior surface*: Wing more elongate than in typical *P. indra*; ground color jet black; pale yellow submarginal spots slightly less prominent and pale yellow postmedian band more prominent than in typical *P. indra*; character of blue scaling and anal eyespot similar to typical *P. indra*. *Primaries, inferior surface*: Similar to superior surface, although light markings cream rather than light yellow and slightly more extensive. *Secondaries, inferior surface*: Similar to superior surface, although light markings cream and slightly more extensive; some pale orange scaling along outer edge of postmedian band and in anterior two submarginal spots. *Head, thorax, abdomen*: Coloration as in typical *P. indra*.

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FEMALE.—*Forewing radius*: 40.9–48.1 mm. *Tail length*: 5.4–7.5 mm. Head, thorax, abdomen, wing shape, range of color pattern variation similar to male.

Holotype male, JETT CANYON, 6,600 FEET ELEVATION, EAST SIDE; TOIYABE RANGE, NYE COUNTY, NEVADA, 3 August 1967, John F. Emmel.

PARATYPES.—11 males and 9 females. Data as follows (all localities east side Toiyabe Range, Nye County, Nevada): 9 males, 5 females, Jett Canyon, 6,500–6,800 feet elevation, 3 August 1967. John F. Emmel, Oakley Shields, and Scott Ellis, 2 males, 2 females, Summit Canyon, 7,000–7,200 feet elevation, on 30 June 1968. Reared by Chris Henne on *Tauschia parishii* C. & R. at Pearblossom, California; emerged 29 and 30 May 1969.

The holotype and eight paratypes will be deposited in the collection of the Los Angeles County Museum, Los Angeles, California. Two paratypes are deposited in the collection of the Allyn Foundation, Sarasota, Florida, two paratypes in the Florida State Collection at Gainesville, one paratype in the collection of Chris Henne, Pearblossom, California, four paratypes in the collection of John F. Emmel and Thomas C. Emmel, Idyllwild, California, and one paratype in the collection of Thomas C. Emmel at the University of Florida.

The August specimens of the type series represent a summer brood; those taken in late June represent the end of the spring brood which probably emerges in May. The spring brood specimens appear to average smaller in size than the summer brood individuals. The summer brood does not appear to be a yearly phenomenon; no individuals were taken in August 1968, and only one was taken in August 1969 (although spring broods in these two years were apparently small). Larvae of the new subspecies were found on *Pteryxia petraea* (Jones) C. & R. in Jett Canyon in 1967, and in Summit Canyon, Nye Co., and Kingston Canyon, Lander Co., in 1968 and 1969, and show additional character differences which will be described in detail in a separate paper on the biology of *P. i. nevadensis*.

The new subspecies superficially appears closest to *P. i. pergamus* Hy. Edwards from southern California; however, *P. i. pergamus* has more angular wings, is smaller, and is always single-brooded in contrast to *P. i. nevadensis* which may have a second brood if the conditions are favorable. There are also major differences in the immature stages of *P. i. pergamus* and *P. i. nevadensis*.

The full range of *P. i. nevadensis* has not been determined. It probably will be found in most of the ranges adjacent to the Toiyabe Range wherever the foodplant *Pteryxia petraea* grows. One *P. indra* larva was

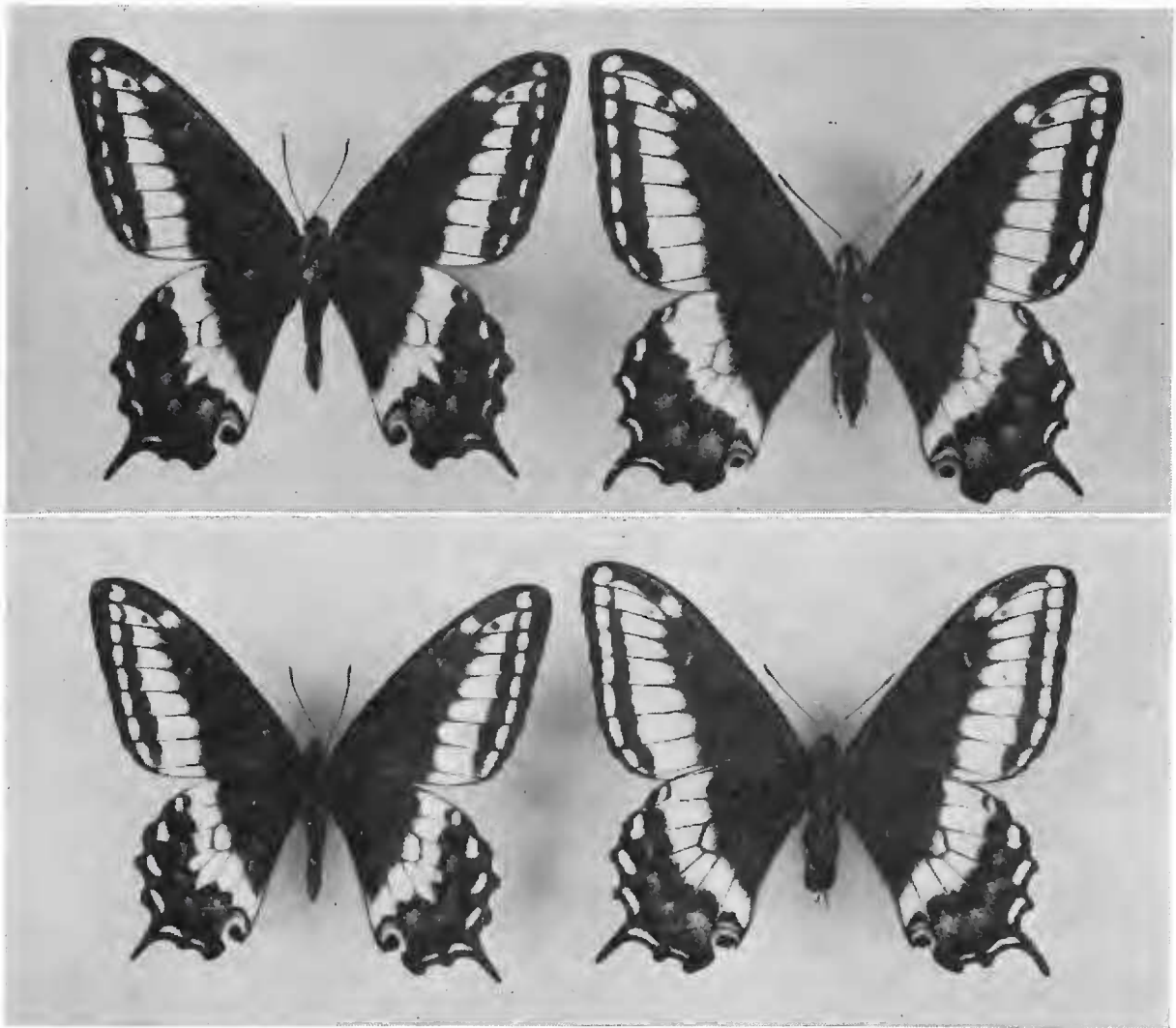


FIG. 1. *Papilio indra nevadensis* Emmel and Emmel, new subspecies. Holotype (male) on left and paratype female on right; dorsal surfaces above, ventral surfaces below. Male from Jett Canyon, 6,600 ft. elevation, and female from Summit Canyon, 7,000 ft. elevation, both localities in Toiyabe Range, Nye County, Nevada.

collected on *Pteryxia petraea* at six road miles east of Manhattan in the Toiyabe Range, Nye County, Nevada, on 9 July 1969; this larva failed to pupate, but was indistinguishable from larvae of *P. i. nevadensis* from the Toiyabe Range about 15 airline miles from this locality, and probably represents this subspecies. Mr. Peter J. Herlan of the Nevada State Museum, Carson City, Nevada, has taken two specimens of *P. indra* in the Humboldt Range, Pershing County, Nevada, which appear to represent spring brood specimens of *P. i. nevadensis*. *P. indra* populations in the Spring Mountains, Clark County, Nevada, about 200 airline miles south of the type locality of *P. i. nevadensis*, appear to be intermediate between *P. i. nevadensis* and *P. i. martini* (Emmel & Emmel, 1966, 1968). It is obvious that a considerable amount of field work will be necessary to determine the full distribution and variation of *P. indra* populations in the western Great Basin.

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LITERATURE CITED

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SCIENTIFIC NOTE

Mass movement of *Tarnetrum corruptum* (Odonata : Libellulidae).—The observation of a unidirectional mass movement of the dragonfly *Tarnetrum corruptum* (Hagen) (Libellulidae) was particularly notable since it was an almost exact repetition of a movement observed by B. Furman and reported by Turner (1965, *Pan-Pac. Entomol.*, 41: 66-67).

On 25 September 1970 between 17:30 and 18:00 PDT in University Village, Albany, Alameda County, California, individuals of *Tarnetrum corruptum* were flying due east across a 50-foot front at a rate of four per minute. Most individuals flew about four feet above the ground, but some flew as high as 20 feet. At the time there was a light easterly wind of about five miles per hour. During the period the dragonflies were moving across a front which extended at least from Albany to University Avenue in Berkeley.

No individuals were noted on the days before or after the event, although all were unseasonably hot.

The first observation alluded to above, the only other recorded mass movement of this species, took place on 24-26 September 1963 at nearby Kensington (two air miles distant). Then, the individuals were noted flying in the same direction at the same time of day.

Taken together these two observations reflect an event of at least periodic recurrence or are highly coincidental.—PAUL A. OPLER, *University of California, Berkeley 94720*.